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| 10/821,177 | 04/09/2004 | Motohiro Suzuki | L7002.04101 | 8410 |
| 24257 7590 05/14/2007 STEVENS DAVIS MILLER & MOSHER, LLP 1615 L STREET, NW SUITE 850 WASHINGTON, DC 20036 | | | EXAMINER SEIFU, LESSANWORK T | |
| | | | ART UNIT 1709 | PAPER NUMBER |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/821,177

Applicant(s)

SUZUKI ET AL.

Examiner

Lessanework T. Seifu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 18-21 is/are rejected.
- 7) ☒ Claim(s) 2-17 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04/09/04 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 18, 19, and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Komiya et al (US 2002/0042035 A1).

Regarding claim 1, Komiya teaches a reformer (fig. 1) configured to reform a material using steam supplied from a evaporator that evaporates water supplied from a water supply portion into steam (page 4, paragraph [0059] and page 3, paragraph [0046]), from the above disclosure, it can be construed that the heating channel (fig. 1 (48)) formed between CO modifying catalyst layer and CO selective oxidation catalyst disclosed in Komiya as an evaporator;... a material flow passage through which the steam and the material are supplied to the reformer (page 4, paragraph [0062]); a shifter configured to shift carbon monoxide contained in the reformed gas into carbon dioxide by a shift reaction (page 5, paragraph [0074] and [0077]), giving the term “shifter” its broadest interpretation as presented in the claim, would include the CO shift layer and the CO selective oxidation catalyst, which causes an oxidation reaction that

decreases the CO content in the reformed gas disclosed by Komiya;... a reformed gas flow passage through which the reformed gas is sent to the shifter (fig. 1 (50) and page 5, paragraphs [0072] and [0075]); a combustor configured to heat the reformer using a combustion gas (fig. 1 (18) and page 5, paragraph [0085]), wherein the reformed gas flow passage and the evaporator are configured to conduct heat exchange between them, a part of heat of the reformed gas flowing through the reformed gas flow passage is used to generate the steam in the evaporator (page 3, paragraph [0046]). Regarding the transfer of radiation heat from the shifter to the evaporator through the reformed gas flow passage, it is inherent that the heat exchange taking place between the heating channel (fig. 1 (48)) formed between CO modifying catalyst layer and CO selective oxidation catalyst can also be in the form of radiation heat.

Regarding claim 18, ... wherein the evaporator is constituted by one evaporator and the evaporator is configured to recover the heat of the reformed gas, heat of the combustion gas derived from the combustor and/or radiation heat from the reformer (page 5, paragraph [0085], and page 7, paragraph [0106]) the disclosure by Komiya as referenced above meets the limitations in claim 18.

Regarding claim 19, Komiya discloses a reformer constituted by a plurality of circular cylinders mounted coaxially which forms gas flow path having a plurality of gas flow path sections, to define a material flow passage, reformed gas flow passage, shifted gas flow passage, combustion gas flow passage,

evaporator, reformer extending along a central axis of the body, and the shifter being located radially outward relative to the reformer so as to enclose an outer periphery of the reformer in the axial direction (see fig. 1 and 2, and page 4, paragraph [0058]); the material flow passage disposed so as to enclose the outer periphery of the reformer, again see fig. 1(48), and one end of the reformed gas flow passage is fluidically connected to one end face of the reformer in the axial direction corresponding to a downstream face of the reformer (see fig. 1, and page 4, paragraph [0070]) fig. 1 in the reference shows that the reformed gas flow passage communicates with one end of the reformer... the reformed gas flow passage is configured such that one end portion thereof is fluidically connected to an opposite end face of the reformer in the axial direction corresponding to a downstream face of the reformer and an opposite end thereof is disposed along and fluidically connected to one end face of the shifter (see fig. 1, page 4, paragraph [0070] and page 5, paragraph [0075], ... the shifted gas flow passage is configured such that one end thereof is fluidically connected to an opposite end face of the shifter corresponding to a downstream face of the shifter (fig. 1, page 5, paragraph [0074] and [0075]), ... and the evaporator is disposed adjacent the combustion gas flow passage and the reformed gas flow passage (see fig. 1, and page 7, paragraph [0106]).

Regarding claim 21, which claims a fuel cell power generation system comprising a hydrogen generator having all of the limitations of claim 1, Komiya discloses that the reformer described in the reference as applied to claims 1, 18,

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and 19 above, can be used as a hydrogen generator for a fuel cell (page 3, paragraph [0047]).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

◦ obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

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consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Komiya in view of Ukai et al. (US 2003/0129100 A1).

Komiya discloses hydrogen generator as applied to claims 1, 18, and 19 above, but the reference is silent in regards to a temperature detector configured to detect temperature of the shifter, wherein, based on the temperature of the shifter, the amount of water supplied from the water supply portion to the evaporator is adjusted. Ukai discloses a hydrogen purification apparatus including a shifter having a shifting catalyst and a reforming section for supplying hydrogen gas. In the disclosure Ukai teaches that the temperature of the shifting catalyst body may be controlled by installing a temperature measurement section along the side of the shifting catalyst body (page 5, paragraph [0114]).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have included a temperature detector near the body of the CO selective oxidative catalyst layer or the shift layer in Komiya, because Ukai teaches that installing a temperature measurement section would enable control of the temperature of the shift catalyst body.

Allowable Subject Matter

7. Claims 2-17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The above claims would be allowable because the prior art fails to disclose or render obvious a hydrogen generator comprising a first evaporator configured to evaporate water supplied from a first water supply portion into first steam, a second evaporator configured to conduct heat exchange, and to evaporate water supplied from a second water supply portion into second steam, wherein the second evaporator is located above a shifter in the hydrogen generator, a temperature detector configured to detect temperature of the shifter, wherein, based on temperature of the shifter, an amount of the water supplied to the second water supply portion to the second evaporator is adjusted.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lessanework T. Seifu whose telephone number is 571-270-3153. The examiner can normally be reached on Mon-Thr 7:00am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Griffin can be reached on 571-272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LS
05/02/07


WALTER D. GRIFFIN
SUPERVISORY PATENT EXAMINER